

**SECTION 4.0 – SELECTION OF THE PREFERRED  
ALTERNATIVE CAD CELL SITE**

#### **4.0 SELECTION OF THE PREFERRED ALTERNATIVE CAD CELL SITE**

This section of the Harbor DMMP FEIR presents the process used to name the selected preferred alternative for the disposal of UDM in CI or PIN CAD cell(s). The construction of these CAD cells includes excavation of parent sediment, deposit of UDM in the cell in the most environmentally sound and cost-effective manner, and capping with clean cover material to permanently protect the harbor marine ecology from effects of contamination. This decision process is continued in an objective comparative assessment of the environmental impacts of each of the two proposed preferred alternative CAD cells presented in the DEIR. Both state and federal laws guide the development of the alternatives analysis contained in this section of the DEIR. The two principal statutes are:

(1) Massachusetts Environmental Policy Act (MEPA), Massachusetts General Laws (MGL) Chapter 30, Sections 61 and 62A-H. MEPA is the environmental review statute of the Commonwealth. The New Bedford/Fairhaven Harbor DMMP FEIR is being prepared under MEPA. This environmental legislation provides an opportunity for public review of potential environmental impacts in projects that require state agency actions (e.g., permits, funding, or agency-sponsored projects). Most important, MEPA functions as a vehicle to assist state agencies in using: “... *all feasible means to avoid damage to the environment or, to the extent damage to the environment cannot be avoided, to minimize and mitigate damage to the environment to the maximum extent practicable.*” (MEPA, 1998)

MEPA requires an analysis of “*reasonable alternatives and methods to avoid or minimize potential environmental impacts*” (301 CMR 11.07(6)) and that all “feasible” alternatives be analyzed in an EIR. Feasible alternatives means those alternatives considered: “... in light of the objectives of the Proponent and the Mission of the Participating Agency, including relevant statutes, regulations, executive orders and other policy directives, and any applicable Federal, municipal, or regional plan formally adopted by an Agency or any Federal, municipal or regional governmental entity” (301 CMR 11.07(6)(f)). The Proponent shall ordinarily use the review and comments by any Person or Agency on the DEIR as an additional opportunity to improve the planning and design of the Project.

In accordance with 310 CMR 11.08(8)(b), the Secretary has determined that the draft EIR is adequate and the Proponent has prepared this final EIR. The scope of this FEIR is limited to additional site-specific information and analysis and response to agency comments. The FEIR presents a complete and definitive description and analysis of the Project and the two proposed preferred alternatives, an assessment of the potential environmental impacts and mitigation measures sufficient to allow a Participating Agency to fulfill its obligations in accordance with M. G. L. c. 30, section 61 and CMR 11.12(5).

2. Clean Water Act (CWA), in particular the Section 404(b)(1) guidelines of the US Environmental Protection Agency (Title 40, Code of Federal Regulations (CFR), Part 230), require that “practicable” alternatives to a proposed discharge to waters of the United States be considered, including avoiding such discharges, and considering alternative aquatic sites that are potentially less damaging to the aquatic environment. The goal of the Section 404(b)(1) guidelines is to provide a framework for arriving at the Least Environmentally Damaging

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Practicable Alternative (LEDPA). While the alternative selected for implementation needs to be the least environmentally damaging, i.e. resulting in the least amount of human and natural environment impact of the alternatives studied, it also needs to be practicable. The term “*practicable*” means “*available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.*”

### **4.1 Analysis of CAD Cell Preferred Alternatives; Channel Inner and Popes Island North**

#### ***4.1.1 Disposal Site Screening Process***

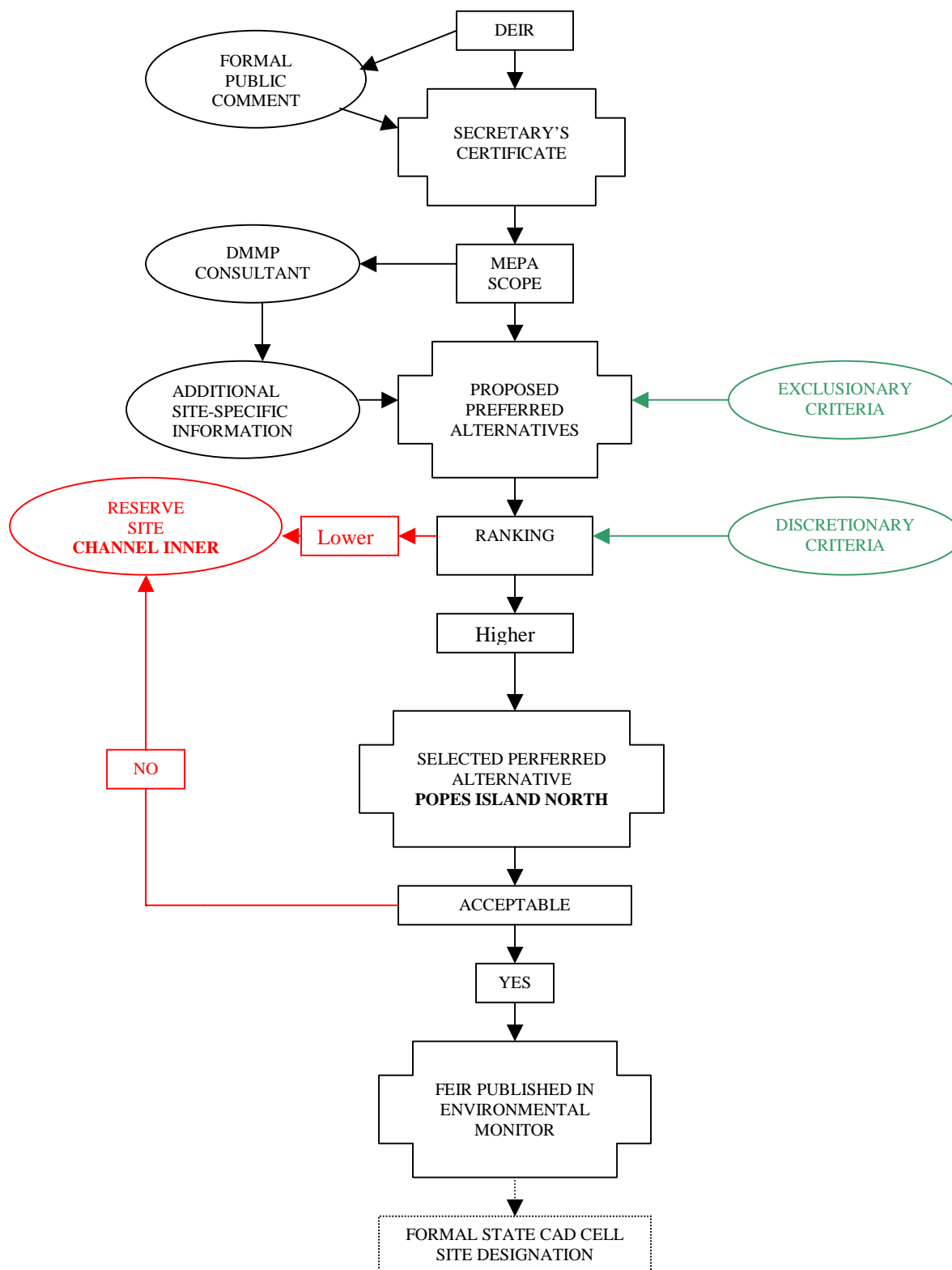
The disposal site screening process begun in the DEIR assessed all possible alternatives through the sequential application of environmental, social and economic criteria. As potential sites with significant conflicts were removed from consideration, the assessment of remaining sites became more detailed. In the FEIR only the two proposed preferred alternative sites from the DEIR are subject to intensive evaluation to determine which remaining site best meets the goals of the Harbor DMMP (Figure 4-1).

A universe of disposal sites was developed during DMMP Phases I and II. The universe included historic dredged material disposal sites recommended by the USACE as well as sites suggested by the Harbor Dredged Material Management Committee. These sites were evaluated in a tiered process. The result of this process was the identification of a range of practicable and reasonable disposal site alternatives. These sites, determined through the evaluation process described below, were evaluated in detail in the DEIR.

There are two general types of screening criteria, exclusionary and discretionary. Exclusionary criteria are those that would unequivocally prohibit disposal of UDM at a particular site. Exclusionary criteria have a basis in federal or state law. For example, locating a disposal site in an area occupied by an endangered species would be prohibited under the federal Endangered Species Act.

Discretionary criteria are those factors that are used to weigh the relative attributes and drawbacks of sites. They do not prohibit use of a site for disposal of UDM, but they do, in total, allow for a comparative analysis of each site. Discretionary criteria in the DEIR were grouped into the following functional areas: physical, jurisdictional, biological, economic and other. In the FEIR discretionary factors include: physical, biological, chemical economic regulatory, practicability and human use.

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**Figure 4-1.** New Bedford/Fairhaven DMMP Preferred Alternative Screening Process

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The FEIR applies site-specific field analysis to compare the two preferred alternative from the DEIR. A series of discretionary criteria appropriate for the additional site-specific information gathered for the FEIR were then applied to the CI and PIN CAD cell areas alternatives. At this stage in the process, both sites had potential as dredged material disposal site(s). Attributes and drawbacks of the proposed preferred alternative sites were considered. The result was the choice of the Popes Island North site as the preferred alternative.

### 4.1.2 *Screening Results*

The evaluation of the two preferred alternative sites with respect to the discretionary screening criteria are discussed below.

#### 4.1.2.1 Discretionary Criteria

**Character of Bedrock Profile** - Bedrock surface irregularities like precipice formations present restrictions to UDM CAD cell disposal capacities by displacing the volume of the void. Fractured bedrock surfaces may give an illusive depth to bedrock interpretation, thus providing CAD cell design engineers with unreliable information for potential CAD cell depth design. Data from the four additional Phase II borings were applied to recalibrate the existing bedrock profile model for greater confidence. Profiles generated from the data indicated that the bedrock character in both the CI and PIN areas is similar, irregular, and marked by undulations of the bedrock surface.

**Depth of Sediment to Bedrock** - A more definite understanding of site-specific sediment depth provides CAD cell engineers critical inputs for CAD cell capacity design parameters. Phase II marine boring explorations included a more definite understanding of site-specific sediment depth provided CAD cell engineers critical inputs for CAD cell capacity design parameters (Table 4-1). In the investigation of the potential storage volume within the configured Channel Inner CAD cells, the average depth of sediment to bedrock was 27 feet. The following site-specific stratigraphic layers established this depth: five-foot average organic silts, 16-foot average interbedded silts, sands and gravels and 6-foot glacial till. It is apparent that the shallow depth of sediment to bedrock at the configured cells of the CI area will severely limit the potential capacity in this area.

In the configured Popes Island North CAD cells, the average depth of sediment to bedrock was 71 feet. This depth was established by the following site-specific stratigraphic layers 17-foot average organic silts, 49-foot average inter-bedded silts, sands and gravels and 5-foot glacial till. Contrary to the shallow average depth to bedrock at the CI area cells, it is apparent that the comparatively deep sediment to bedrock at the PIN cell area is satisfactory for the capacity of UDM in New Bedford Harbor.

**Table 4-1.** Summary of site-specific stratigraphic layers average thickness

	Organic Silts	Inter-bedded Silts, Sands, Gravels	Glacial Till	Total Depth to Bedrock
CI	5 ft.	16 ft.	6 ft.	27 ft.
PIN	17 ft.	49 ft.	5 ft.	71 ft.

**Sediment Stratigraphy** - Physical characteristics of the full depth of submarine soils to bedrock, is critical to the CAD cell side slope design. It is important to maintain the integrity of submarine CAD cell side slopes for the short-term of construction and the long-term to prevent CAD cell structural integrity. The boring information developed for the FEIR showed the two proposed CAD cell sites had similar geologic stratigraphy, from mudline (sea bottom) down. The recommended 1V: 3H CAD cell side slopes assumed the variety of sediment types involved. Stable and constructible CAD cell side slopes of 1Vertical: 3Horizontal (1V: 3H) are feasible and appropriate at both the CI and PIN site areas.

**Containment Characteristics** - The depth and bathymetry (existing or after construction) were evaluated to assess containment characteristics. As described in section 3, CADs that will effectively contain contaminated sediment can be constructed at either the CI or PIN site.

**Surficial Sediment Physical and Chemical Analyses** - As described in Section 3.0, one representative surficial sediment sample from each of the preferred alternative CAD cell site areas was analyzed in detail for physical and chemical character. Vibracore samples were taken at two-foot intervals. The predominant metal, copper, as well as other metals concentrations diminish by the third interval sampling station. PCBs were detected above laboratory limits on both CAD sites in the surficial sediment chemistry analyses of this FEIR (Section 3.5). Site-specific third interval stations were tested for the comprehensive laboratory suite of analysis. A four-foot sediment layer was identified as UDM for the preferred alternative CAD sites area-wide surficial sediment investigation of this FEIR.

**Ambient Sediment Conditions** – The sediment type was recorded from surficial sediment grab samples and compared to the remotes surveys in the DEIR. Preferred alternative site specific surficial sediment grab samples were taken for the FEIR. The PIN and the CI sites are characterized by the predominance of fine-grained silt and clay (ENSR, 2003)(Maguire 2002). Two exceptions were found with CI stations NBH-218-MAC that was mostly sand (70%) with nearly 20% gravel and station NBH-214-MAC had approximately 47% sand, 47% silt and clay, and 6% gravel. One exception was found in PIN at station NBH-204-MAC which had more than 70% gravel and sand. Areas where sediment is similar to that of the UDM to be placed there, (i.e., soft, silty and homogenous), are preferred over areas where ambient sediment is coarse-grained or mixed.

**Conceptual CAD Cell Engineering**- CAD cell design parameters other than those mentioned above include; average bedrock elevation, average bathymetric elevation, sediment thickness, available dredged depth, total dredged volume, total storage capacity, bedrock buffer, and cap thickness.

Preliminary engineering design objectives for preferred alternative CAD cell configurations of this FEIR evolved from the conceptual CAD cell design of the DEIR. In the DEIR, the physical area of impact was an important factor in evaluating disposal sites. Because most of the biological activity in sediment is within the upper 2 feet, it is important to limit the disturbance to as small a footprint as possible. The DEIR presented the concept that a disposal area that is relatively small in area, with a large cell depth, is preferred over a site that is relatively large in area, but has a shallow cell depth. Also the DEIR mentioned the discriminating factor in determining physical area of impact, particularly for sites in the Harbor, is the depth to bedrock. In the DEIR site capacity was the most important consideration. It determined whether a single site or multiple sites would be needed to confine the material requiring dredging (Maguire Group Inc., 2002). In the FEIR specific CAD cell area capacity is the most important consideration. In the FEIR the CAD cell configuration approach was to provide a series of five moderate volume cells of approximately 50,000cy each, as well as a comprehensive large volume dredge project, of approximately 1,800,000cy (Table 4-2). The conceptual design approach of the FEIR was driven in the interest of the New Bedford Harbor Development Commission (NBHDC) request for moderate capacity cells appropriate for the incremental moderate scale dredging projects consistent with near-term goals of the Harbor Plan. The expanded high capacity cell was provided for future long-term harbor-wide comprehensive dredging disposal needs.

Uniformly shallow sediment depth to bedrock makes the CI site inefficient to develop. Moderate volume project CAD cells were configured for CI in the FEIR. However, the effort to sequester only  $\pm 50,000$ cy includes excavation of  $\pm 179,300$ cy parent material, roughly 3.51 times the UDM on average (Table 4-2). By maintaining a 100-foot surface buffer between the CAD cells only three moderate capacity cells fit within the CI CAD cell area footprint. The inefficiency is due to the limited five-foot depth for contaminated dredge project material after taking into consideration the following design parameters; ten-foot bedrock buffer, four-foot suitable cap, additional three-foot operational and maintenance contingency (for protection against over-dredging) and four-foot contaminated CAD cell footprint layer. Hence to accommodate dredged materials volumes the Channel Inner CAD cell footprints must be widely spread-out. The presence of Federal Navigation, Maneuvering and Anchorage areas in the vicinity of the Channel Inner site further complicate this area's development.

The PIN CAD cell area will accommodate at least five moderate volume dredge projects,  $\pm 50,000$ cy each, as well as a large volume dredge project,  $\pm 1,800,000$ cy. However, on average, the effort to sequester only  $\pm 50,000$ cy includes excavation of  $\pm 80,405$ cy parent material, roughly 1.6 times the UDM. The proposed PIN CAD cell depth profiles fit well with revealed subsurface conditions. The relatively shallow sediment depths along the area's eastern extent, near Marsh Island, favor the moderate project CAD cell approach. The deeper sediment depths along the western bedrock valley, adjacent to Popes Island, favor a high capacity project CAD cell approach. Development of moderate size CAD cells in the eastern PIN area will likely assume a multiple-step sequential approach where in-channel type CAD cell(s) can be constructed with completed depths to accommodate vessel traffic from the existing navigable channel to the Marsh Island side. Final CAD design will be determined by project-specific need and long-term management considerations.

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**Table 4-2.** Comparison of average parent material volumes in Preferred Alternative CAD sites.

Site	Moderate CAD Cell Size	Parent Material	Level of Effort
CI	±50,000cy	±179,300cy	3.51
PIN	±50,000cy	±80,405cy	1.6
	(differences)	±98,895cy	1.91

**Physical Area of Impact** - The amount of sea floor in acres that would be directly affected by disposal activities was estimated. The CI CAD cell area will require a larger foot print than the PIN CAD cell to contain the same volume of material due the relatively shallow depth of sediment to bedrock. The depth of sediment to bedrock at PIN allows smaller CAD cell footprint areas due to deep cell geometry. Total estimated area of impact of each CAD cell area is approximately 90 acres for CI and 80 acres for PIN. Within those areas the footprint of the conceptual CAD cells at the CI site is approximately 20 acres; and 35 acres at the PIN site.

**Historic/Archeological Sites** - The two sites specifically were evaluated for potential cultural resource constraints through consultation with the Massachusetts Bureau of Underwater Archaeological Resources (MBUAR) and review of positions of shipwrecks and artifacts of maritime history. Because the disposal of UDM at a significant historic or archaeological site could be prohibited, a detailed analysis was prepared for this FEIR. No significant historic or archaeological sites were identified at either the CI or PIN areas.

**Water Depths** - The existing depths of the disposal sites were obtained from bathymetric surveys or NOAA charts. Final depths after construction or fill were estimated from this available existing depth data. The PIN Cad Cell area lies in shallow water, generally less than 20 feet, which requires a somewhat more complex approach to development than the CI site; however, shoal draft barges and/or in-channel CAD type approaches can address limited draft problems (GLDD, personal communication 2003).

**Surface Water Analysis** - Surface water was analyzed to determine what site-specific background water chemistry and turbidity values. Surface water was collected from preferred alternative site-specific locations and one control location in the Harbor and samples were analyzed at a certified testing laboratory to detect any hazardous levels for chemical concentrations of concern. The parameters tested for surface water quality indicate a relatively consistent, homogeneous setting with depth with no differences between the PI and PIN sites.

**Hydrodynamics: Current Patterns, Water Characteristics** - CAD cell construction and related dredging activities are likely to resuspend dredged materials through operations. Hydrodynamics of water bodies above CAD cell locations are important to predict resuspended sediment transport and instantaneous chemical release dispersion as well as future water quality monitoring. The hydrodynamic modeling examined physical field data (surface elevations and velocities) to identify primary force that drive the circulation in New Bedford Harbor.

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Hydrodynamic conditions were modeled in the DEIR based on the inputs from existing literature. In the DEIR the semi-diurnal Harbor currents were thought to be on the order of 10 cm/s (0.2 kt.) (ASA, 2001). Modeling predicted current speed in the CI CAD cell area would be almost 2.5 times higher than at PIN. The modeling predicted that current directions at the CI site would be primarily unidirectional along the northwest-southeast direction and that PIN currents would be elliptic with more western orientation.

For the FEIR site-specific hydrodynamic data was acquired for each site. These data indicate that the depth-averaged currents at the CI site showed a regular response to the tides. Flow to the south during the ebb tide appeared slightly stronger and more sustained than the northward flow observed during the flood tide. Depth averaged currents averaged 4.0cm/s/(0.13 ft/s)(ASA, 2003) Depth averaged currents at PIN site were predominantly to the southeast during the fall study period, though flows to the north did occur during flood tides. Depth averaged currents had a mean speed of 2.3 cm/s (0.49 ft/s) (ASA, 2003).

After the preliminary screening analysis indicated that the PIN site would be the preferred alternative, modeling passed on the specific site inputs was conducted for the PIN Site. This confirmatory modeling is described in Section 5.0.

**Potential for Sediment Resuspension and Erosion** -The effect of currents, from tides, storms, and vessel traffic, can affect the movement of sediments. UDM disposal in areas where bottom currents from various hydrodynamic forces are low is preferred over areas of potential high velocity (i.e., erosive) currents. The Harbor is protected from storm related surge by a hurricane barrier and tidal and wind induced currents at both preferred alternatives are not erosional. The CI CAD cell area occupies a high vessel traffic area and is located partially within the federal channel. The PIN CAD cell area is in a protected location subject to much less commercial/industrial vessel (deep draft) traffic.

**Navigation/Anchorage** – The proximity and depth relative to shipping lanes, designated channels and anchorages was assessed for each site. Sites located within existing channels or anchorage areas are less preferred than areas more heavily used for navigation. The proximity and depth relative to shipping lanes, designated channels and anchorages was assessed for each site. Sites not located within existing channels or anchorages are preferred over areas used for navigation. As noted above the CI site located partially in the federal channel and in the vicinity of the heaviest commercial and industrial vessel traffic of the Harbor. Harbor developments will increase vessel traffic over the CI CAD cell area. In contrast the PIN CAD cell area is in a protected location subject to much less commercial/industrial vessel (deep draft) traffic.

**Site Accessibility** - Accessibility is determined by the following factors: Route; The most practical route for tugs and barges for transit to and from the dredging area and disposal site. Distance; The distance based on the practical route was calculated from the head of navigation of the proposed dredging project. Logistics; Any potential logistical problems that might be encountered in use or construction of the proposed site. As described above, the CI site is in deeper water, which facilitates disposal access, but is subject to greater vessel traffic, which complicates the logistics of disposal. The PIN site demonstrates the opposite characteristics.

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**State and Federal Permits and Licenses-** Applicable State and federal permits and licenses and their applicability to the CI and PIN sites is discussed in Table 4-3, below. Both sites are permittable for the proposed use.

**Table 4-3.** Summary of Exclusionary (E) and Discretionary (D) Screening Factors for Aquatic Disposal

SCREENING FACTORS	EVALUATION CRITERIA	GOAL
<b><u>Exclusionary Factors</u></b>		
<b><i>Rare and Endangered Species / Critical Habitat</i></b> E - 16 USC 470 <u>et seq.</u> 16 USC 1531 <u>et seq.</u> MGL Chap. 131A 321 CMR 10.60	Amount and quality of habitat, species, time of year occupied	Protect habitat integrity, avoid disturbance during period of use/occupation
<b><i>Federal Marine Sanctuaries</i></b> E - 33 USC 1401	Type, distance, time of year restrictions	Meet Federal requirements
<b><i>ACECs (Areas of Critical Environmental Concern)</i></b> E - 301 CMR 12.00	Type, distance, time of year restrictions	Meet State requirements
<b><u>Discretionary Factors</u></b>		
<b><i>Physical Characteristics</i></b>		
<b><i>Character of Bedrock Profile</i></b> D	Surface conditions, presence of precipice formations	Find CAD cell capacity, rule out CAD cell construction impediments
<b><i>Depth of Sediment to Bedrock</i></b> D	Sediment depth	Sediment depths for engineering
<b><i>Sediment Stratigraphy</i></b> D	Stratigraphy	Soil properties for engineering
<b><i>Containment Characteristics</i></b> D	Currents, grain size, value of adjacent areas	Maximize long-term containment confidence
<b><i>Surficial Sediment; Physical &amp; Chemical Analysis</i></b> D	Full suite laboratory analyses	Identify UDM layer/SDM layer
<b><i>Ambient Sediment Conditions</i></b> D	Grain size, existing quality	Minimize adverse change to existing bottom
<b><i>CAD Cell Engineering</i></b> D	Geotechnical, geophysical parameters	Meet moderate to high capacities
<b><i>Physical Area of Impact</i></b> D	Size of area affected	Minimize area adversely affected
<b><i>Historic/Archeological Sites or Districts</i></b> 16 USC 469 MGL Chap. 40C 312 CMR 2.0 – 2.15 D - Non-designated sites	Type of site, presence, significance of features	Protect site integrity
<b><i>Water Depth</i></b> D	Depth relative to environmental and navigational use	Protect navigation; maximize containment
<b><i>A-14. Surface Water Analysis</i></b> D	Background water quality, turbidity	Background, turbidity values for resuspended sediment dispersion modeling

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**Table 4-3:** Summary of Exclusionary (E) and Discretionary (D) Screening Factors for Aquatic Disposal (continued).

SCREENING FACTORS	EVALUATION FACTORS	GOAL
<b>A-15. Hydrodynamics; Current Patterns, Water Circulation</b> <b>D</b>	Current speed, transport direction	Avoid, minimize, mitigate adverse impacts
<b>A-17. Potential for Sediment Resuspension and Erosion</b> <b>D</b>	Wave heights, direction, fetch	Maximize long-term containment confidence
<b>A-18. Navigation/Anchorage</b> <b>D</b>	Amount, type, draft	Avoid, minimize, mitigate adverse impacts
<b>A-19. Site Accessibility</b> <b>Route</b> <b>Distance</b> <b>Logistics</b> <b>D</b>	Navigation limitations Length, time to transport Re-handling, storage	Minimize disruptions Maximize efficiency Reduce risks of Re-handling
<b>Jurisdictional Considerations</b>		
<b>State Jurisdictions</b>		
<b>A-20.</b> <b>D</b> <b>MEPA FEIR Certificate Site Designation, CZM</b>  <i>Chapter 91 License, DEM;</i> Dredging and/or filling within flowed tidelands  <i>401 Water Quality Certificate,</i> DEP; Fill or excavation in State Territorial tidelands,  <b>Wetlands Protection Act</b> , DEP; Land Under the Ocean, Land Containing Shellfish Anadromous/Catadromous Fish Runs	Amount, type, benefits, impacts, recovery potential	Avoid, minimize, mitigate adverse impacts
<b>Federal Jurisdiction</b>		
<b>A-21.</b> <b>D</b> <b>Coastal Zone Management Act</b> ; Federal financial and technical support CZM; Ensure Federal Consistency with Federally approved coastal State management programs, actions including natural resource or water use <b>Clean Water Act Section 404</b> , Federal Jurisdiction - EPA; Oversight, USACOE; Implementation <b>Rivers and Harbors Act Section 10</b> ; USACOE regulates, work in or effecting navigable waters	Amount, type, benefits, impacts, recovery potential	Avoid, minimize, mitigate adverse impacts

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**Table 4-3:** Summary of Exclusionary (E) and Discretionary (D) Screening Factors for Aquatic Disposal (continued).

<i>Biological Use Factors</i>		
<b>A-16.. Duration of Potential, Adverse Long-term Impacts</b> <b>D</b>	Time, severity, recovery period	Avoid, minimize, mitigate
<b>A-22. Present Habitat Types</b> <b>D</b> <b>-Benthic Habitat</b>  <b>- Shellfish beds</b>  <b>- Nursery and Spawning Potential</b>  <b>- Finfish</b>	Species abundance, density, diversity, and evenness, recolonization potential  Habitat type, quality, heterogeneity, recovery potential, time of year issues  Amount, type, benefits, impacts, recovery potential, distance, time of year issues  abundance, benefits, impacts, recovery potential, time of year issues	Avoid, minimize, mitigate adverse impacts
<i>Economic Factors</i>		
<b>A-23. Commercial and Recreational Fisheries</b> <b>D</b>	Amount, type, quality	Avoid or minimize loss and long-term impacts
<b>A-24. Water-dependent Recreation</b> <b>D</b>	Amount, type, quality	Maximize retention of opportunities
<i>Regulatory/Practicability/Human Factors</i>		
<b>A-25. Ability to Obtain Permit</b> <b>D</b>	Consistency with federal and state regulations	Meet all federal and state guidelines for permits
<b>A-26. Water Quality Thresholds</b> <b>D</b>	EPA designed toxicity testing of ambient water on marine organisms	Provide site-specific water quality thresholds
<b>A-27. Mitigation Potential</b> <b>D</b>	Amount, type of avoidance, minimization, mitigation required/possible through site use.	Avoid, minimize, adverse impacts for finfish Maximize potential for mitigation of existing shellfish
<b>A-28. Consistency with Port Plan</b> <b>D</b>	Values and site-specific uses in port plan	Maximize consistency with near-term to long-term port plans
<b>A-29. Harbor Use</b>	Recent harbor use developments	Allow safest, Most environmentally sound, cost-effective Cad
<b>A-30. Cost</b> <b>D</b>	Near-term to long-term costs of construction and maintenance, including monitoring	Minimize long-term costs

**Duration of Potential Adverse Impacts** – The CI and PIN sites are generally chemically, physically, and biologically similar; impacts and recovery can be expected to be similar for both sites. Both the CI and PIN sites will directly impact shellfish, and while required mitigation will replicate the resource lost at either site, the CI site will effect a potential DMF shellfish relay area. The CI site may also experience greater stress on benthic recovery from more frequent

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vessel impact to the CAD surface than the PIN site. As discussed in the DEIR and below the PIN site appears to provide more significant winter flounder spawning habitat. Existing spawning habitat will be removed through CAD construction but future accumulation of sediment over the cap is expected to eventually replicate existing habitat assuming an annualized sedimentation rate of 1 cm./yr. derived from a meeting with USACE (USACE, personal communication, 2002).

### **Habitat**

*Area of Impact-* The CI site covers approximately 90 acres overall; the PIN site approximately 80 acres overall. Within these general CAD site areas, the footprint of the specific conceptual Cad cells in CI is approximately 20 acres and in PIN is approximately 35 acres.

*Benthic Habitat-* The preferred alternatives have comparable benthic communities comprised of opportunistic species. There is a source of organisms in the Harbor water that will promote recovery of both preferred alternatives benthic communities. The study of the macrofaunal diversity in the harbor-bottom surficial sediment for this FEIR demonstrates that the macrobenthic species community structure has not changed over the course of ten years (ENSR, 2003). The predominant surficial sediment of CI and PIN was silt and clay with high total organic carbon concentrations. The dominant organisms found in the study for the two Preferred Alternative CAD cell areas of this FEIR are classified as pioneering or opportunistic species. The investigation at the Boston Harbor Navigational Improvement Project (BHNIP) CAD cell site showed that within a year of filling and capping the opportunistic benthic infauna had re-colonized the sediment surfaces (ENSR, 2003). It is highly likely that construction, filling, and capping events at Harbor proposed CI and PIN CAD cell sites will only temporarily impact the benthic communities. From this evidence presented in the FEIR, it is expected that CAD cells in the CI and PIN areas, similar to BHNIP cell surfaces, will be recolonized equally rapidly by similar opportunistic species. Eventually, the benthic community will return to a pre-dredging composition. Adults and larvae from adjacent areas, which were not dredged, will provide recruits to the disturbed sites. involves temporary interruption of existing site-specific harbor bottom benthic communities will be recolonized equally rapidly by similar opportunistic species.

*Shellfish Beds* - Sites within or near areas of shellfish concentration, as indicated by DMF and other available sources, are least preferred. Shellfish resources in the CI CAD cell area are likely to include a valuable number of cherrystone quahogs along the western edge off the New Bedford fishing fleet docks (DMF, 1999). The DMF Standing Quahog Study identified shellfish nearest to the western edge of CI as having .58 ppm PCBs., well under the 2.00 ppm. tolerance set by the U. S. Food and Drug Administration and Department of Health (DMF, 1999). Shellfish within CI would likely have commercial and ecological value. Chowder sized quahogs and soft-shell clams were identified as abundant in the PIN CAD cell area by the DMF study (DMF 1999). Shellfish of this area were found to have PCBs levels of 3.60 ppm., well above the standard level mentioned above. Shellfish of the PIN CAD cell have ecological value.

*Nursery and Spawning Potential* - CI showed evidence of nursery habitat for several commercially important species of finfish (i.e., cunner, scup, and black sea bass). PIN site area contained substantial winter flounder spawning and nursery habitat.

*Finfish*- The CI CAD cell area, like other areas of the Harbor, showed a predominance of non-demersal species (i.e., cunner, scup, black sea bass, and Atlantic herring). The PIN CAD cell area supported a different fish community than the CI and other Harbor areas. At the PIN site a lower abundance of juvenile fishes were observed in trawls at the NT 5 station. However, winter flounder frequently collected in the NT5 trawl station of the PIN CAD cell area included variety of life-stages, including young-of-the-year (YOY) winter flounder. The seasonal abundance of fishes and fish assemblages should be considered in the management of either preferred alternative. Seasonal windows should be implemented to limit impacts on spawning and juvenile recruitment.

**Commercial and Recreational Fisheries** - Areas that are not fished, commercially or recreationally, are preferred over those that are actively fished. Both areas of the preferred alternatives are closed to commercial and recreational fishing due to contamination in the Harbor.

**Water-Dependent Recreation** - These activities include: fishing, boating, scuba diving, swimming. Sites are preferred in areas with little or no recreational activity. The CI CAD cell area straddles the federal channel in the Harbor and therefore is used by recreational vessel traffic leaving and entering the Harbor. The PIN CAD cell area is not within harbor channels, and has some recreational vessel traffic. Recreational boating is the only safe recreational activity in the Harbor.

**Ability to Obtain Permit** – Both the CAD and PIN sites are permittable.

**Water Quality Thresholds** - The dredging and disposal at both the CI and PIN sites can be managed to meet tDEP water quality thresholds (See Section 5.0).

**Mitigation Potential** - Commercially and ecologically important shellfish occupying the CAD development areas of the CI area would likely be relayed to a depuration center. This would entail employment of a force of shellfish rakers or possibly a hydraulic shellfish harvester vessel (DMF, personal communication 2003). There is a predicted loss of sedentary shellfish populations of PIN CAD cell area. Shellfish of the PIN CAD cell are contaminated by PCBs above allowable levels for human consumption (MA DMF 1999). Shellfish of the PIN CAD cell area are of ecological value and those lost in the PIN CAD cell development will require replacement conditional to project permitting through fisheries resource agencies.

The seasonal abundance of fishes and fish assemblages should be considered in the management of either preferred alternative. Seasonal windows should be implemented to avoid and minimize impacts on spawning and juvenile recruitment.

**Consistency with Harbor Plan** – Both proposed disposal sites are generally consistent with the New Bedford Harbor Plan in that they provide capacity for proposed dredging projects. The PIN site best meets the intent of the plan, as it provides greater capacity, maximum design flexibility, and does not significantly effect commercial/industrial vessel traffic.

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**Harbor Use** - As detailed in the DEIR, existing commercial navigation in the harbor is largely divided into three primary categories: 1) traffic related to commercial fishing, 2) fish processing industry and, 3) other maritime vessels and recreational boats (Maguire, 2002).

Since the publication of the DEIR, the City of New Bedford, under the auspices of the New Bedford Harbor Development Commission (NBHDC) have completed maintenance dredging of the slip to the south of State Pier, the fairways leading thereto and a portion of the federal navigational and maintenance channel immediately northwest of the proposed CI CAD cell area (Apex, 2002). Ships approaching the State Pier would have to be routed around any dredging operational obstructions of the CI CAD cell. This navigational interruption to ships may be possible, though likely with increased costs. In August 2004 a high-speed ferry is set to begin service between the State Pier and Martha's Vineyard (Providence Journal, 2003). The new high speed ferry operators expect to run as many as ten trips per day, which could equate to as many as 20 course deviations per day, some in darkness, around dredging operations at the CI cell area. Deep draft commercial fishing vessels and frozen fish freighters associated with the Atlantic herring industry frequent a shore fish processing location north of the CI CAD cell area in New Bedford. Increased deep-draft fishing vessel traffic associated with this fish processing plant would face the obstruction posed by dredging operations in the CI CAD cell area.

Due to the location within the navigation channel, development of the CI site will require redirection of vessel traffic around the 24-hour per day dredging operations including tugs and barges. Many vessels may be able to circumvent CAD cell operational obstructions, however for larger vessels with less maneuverability these obstructions pose a greater safety hazard. This risk can be avoided and minimized through by placement of lighted marker buoys around the work area and notifications to mariners through Coast Guard advisories. Issuance of navigational advisories will help place infrequent maritime harbor visitors on notice of disposal activities. Additionally, because disposal will only take place for one season during each planning horizon, opportunity for adequate public notice to frequent harbor users will be provided.

The nature of the construction of CAD disposal cells will not result in any reduction of navigable depth in the Harbor. The four-foot thick sand caps proposed for all of the disposal cells of the CAD preferred alternative sites will maintain existing bottom depths and not protrude into the water column any higher than existing conditions. After the completion of disposal activities for each planning horizon, navigational and shipping conditions in the vicinity of the disposal cells will return to pre-existing conditions.

**Cost** - The cost to develop a series of CAD cells in a specific area in the context of an EIR is best estimated within a range of costs. More accurate estimates will be developed with specific future Harbor projects.

In the DEIR, the cost to develop a CAD cell and subsequent disposal of UDM was estimated to be approximately \$40/cy. In the preliminary CAD cell engineering of the FEIR, the efficiency to excavate and handle parent material became more obvious as an important variable in the cost structure of CAD cell development. For the moderate  $\pm 50,000$  cy CI CAD cell development the level of effort is calculated to be 3.51 cy parent material/ cy sequestered UDM. For the PIN CAD

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site, and moderate  $\pm 50,000$  cy CI CAD cell development the level of effort to is calculated to be 1.6 cy parent material/cy sequestered UDM.

Recent conversations with dredgers have provided inputs helpful to estimate the relative costs of developing the preferred alternatives (GLDD, personal communication, 2003) (Burnham Associates, personal communication, 2003). Increased handling of dredged parent material will step up cost of CI CAD cell area projects to the high end of the estimated cost range shown below in Table 4-4. Development of moderate size CAD cells in the eastern PIN area will likely assume a multiple-step sequential approach where in-channel type CAD cell(s) can be constructed with completed depths to accommodate vessel traffic from the existing navigable channel to the Marsh Island side. Use of the high capacity cell in PIN will likely reflect an economy of scale lower cost (Table 4.4). Moderate volume project time estimates reflect the use of shoal draft moderate capacity scows and tidal cycles and likely cost more per cubic yard than development of the high capacity cell.

**Table 4- 4.** Estimated cost per cubic yard to dispose of UDM with preferred alternatives

<b>Range</b>	<b>\$35 - \$55</b>
<b>CI</b>	<b>\$55</b>
<b>PIN</b>	<b>\$40 - \$45</b>

### 4.1.3 Summary of Screening Results

After an assessment of the two sites under the screening criteria described above, the PIN demonstrates the following advantages over the CI site:

- *Greatest Capacity*
- *Maximum management flexibility*
- *Less impacts to harbor operations, commercial/industrial vessel traffic*
- *Less potential for cap disruption*
- *Better recolonization potential for absence of repeated impact from vessel traffic*
- *Lower cost per cy*
- *Less impact to habitat and resources per unit disposed*

The PIN site appears to contain better winter flounder habitat.

The PIN site is selected as the preferred alternative.

### 4.1.4 Attributes of the Preferred Alternative

Attributes of the selected preferred alternative PIN CAD cell site area are summarized below.

- ***Greatest capacity***–PIN CAD cell configuration provides a series of five moderate volume cells of approximately 50,000cy each, as well as a comprehensive large volume dredge project, of approximately 1,800,000cy In PIN. Even though the capacity is higher than CI, physical area of impact in the PIN CAD cell footprint is lower compared to the CI

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CAD site. To create the PIN CAD moderate volume cells the parent material that must be excavated and handled is less than half the requirement for CI CAD cells of comparable capacity.

The proposed PIN CAD cell depth profiles fit well with revealed subsurface conditions. The relatively shallow sediment depths along the area's eastern extent, near Marsh Island, favor the moderate project CAD cell approach. The deeper sediment depths along the western bedrock valley, adjacent to Popes Island, favor a high capacity project CAD cell approach.

Recognizable precipice formations have been identified as not impediments to cell capacity. In the configured Popes Island North CAD cells, the average modeled bedrock depth was 58 feet compared to 26 feet at CI. PIN average modeled bedrock depth was a full 26 feet lower than the CI area. In the western "bedrock valley" portion of the PIN CAD cell site, the lowest depth to bedrock is minus 95 feet. Contrary to the shallow average depth to bedrock at the CI area cells, it is apparent that the comparatively deep sediment to bedrock at the PIN cell area is satisfactory for the full capacity of UDM in the Harbor. Physical characteristics of the full depth of sub-marine soils to bedrock at PIN CAD area supports stable and constructible CAD cell side slopes of 1Vertical: 3Horizontal (1V: 3H). The 1V: 3H slope design is considered feasible and appropriate for the PIN Selected Preferred Alternative CAD site area.

According to the sampling plan accepted by the USACE, for the selected preferred alternative PIN CAD site, a four-foot sediment layer was identified as UDM. Identification of this site-specific four-foot UDM layer is critical to identify the horizons of UDM as a prerequisite for preliminary CAD cell design engineering.

- ***Maximum management flexibility*** – The PIN CAD cell area allows safe containment of moderate to high capacity UDM volumes generated in future Harbor dredging projects of up to the twenty-year planning horizon. Depth to bedrock allows significant design flexibility for CAD Managers.
- ***Less impacts to harbor operations, commercial/industrial vessel traffic*** – Since the PIN CAD cell area is situated in the northern end of the Harbor and out of navigation channels, development activities will have less impacts to present and future Harbor operations, especially commercial/industrial vessel activity.
- ***Less potential for cap disruption*** – The PIN CAD cell area has less potential for CAD cap disruption than the CI CAD cell area that straddles the federal channel of the Harbor. The CI area is in an area of the Harbor heavily traveled by deep draft commercial/industrial vessel traffic. Propeller wash from deep draft vessels may disrupt capping material in the CI area. The federal channel will be periodically dredged in coming years. Therefore, its capping material, designed to safeguard against UDM recontamination of the environment, is more vulnerable to disruption from over-dredging. The shallower PIN area outside Harbor channel areas is not subject to deep draft commercial/industrial traffic. Capping material in the PIN area is much less likely to be

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disturbed than that of the CI area. PIN is not in an area requiring regular maintenance dredging; therefore, its capping material will not be disturbed by dredging in the future.

- ***Better recolonization potential for absence of repeated impact from vessel traffic*** – The dominant organisms for the selected preferred alternative CAD cell are classified as pioneering or opportunistic species. From this evidence, it is expected that adults and larvae from adjacent undisturbed areas will recolonize CAD cells in the PIN area rapidly through recruitment from surrounding areas. Eventually, the benthic community will return to a pre-dredging composition. As discussed above the PIN Harbor bottom area will not be impacted by regular deep draft commercial/industrial vessel traffic. Therefore, benthic communities inhabiting the PIN cell capping material will not be impacted repeatedly from over-passing vessel propeller wash energy.
- ***Lower cost per cy*** - The CAD cell development options available for the PIN CAD cell area are estimated to cost less than those of CI. In CI the highest cost per cubic yard is due to the extra parent materials handling required to complete the wide and shallow cells. In PIN CAD cell the moderate capacity approach is estimated to be slightly higher than the high capacity approach though either option is estimated to be below the cost per cy at CI.
- ***Less impact to habitat per unit disposed*** – Conceptual CAD cell designs for CI and PIN are presented in this FEIR. Table 4-5 below shows approximate values for impacted habitat per unit disposed in preferred alternatives. The PIN impacts less habitat per unit disposed by approximately half.

**Table 4-5.** Approximate values for impacted habitat per unit disposed in preferred alternatives

	Acres of Habitat	CYs UDM disposal	Acres/cy disposal
CI	20	150,000	.0001333
PIN	35	2,050,000	.0000017
Difference			.0001263